Performance of Swedish sustainable equity funds during Covid-19

– a comparative study on sustainable and conventional equity funds

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Abstract

The interest for sustainable equity funds has increased globally and especially in Sweden the last years. The Swedish and Scandinavian fund markets have grown to be seen as frontrunners for sustainable investments. The growing interest for sustainable funds comes from concerns linked to the global warming, and how companies work with questions within corporate social responsibility and factors within environmental, social and governance. The environmental factor is linked to the production and how much greenhouse gas emissions the company releases. The social factor is how the company treats its employees and the society around the company. The governance factor is how the company works against bribery and corruption. This growing interest for sustainable funds among investors, generates questions how sustainable funds differs from conventional funds in risk-adjusted return during recessions and crises. This thesis focuses on the difference in risk-adjusted return between sustainable and conventional funds during the year of 2020, with the Covid-19 financial crisis in mind.

To examine how the risk-adjusted return differed, 20 funds were selected for examination. Ten funds with high sustainability rating, and ten funds with low sustainability rating. To evaluate the performance of the funds, the risk-adjusted return was calculated through three types of measurement models, the Sharpe ratio, the Treynor ratio and the Jensen's alpha. The performance of the funds was evaluated both for the full year, and for three sub-periods, to reflect different stages of the Covid-19 financial crisis. The findings of the study are that for the full year period, the sustainable funds performed higher risk-adjusted return than the conventional funds. For the sub-periods, the sustainable funds performed higher risk-adjusted returns during all sub-periods except in the second sub-period when calculating the Treynor ratio. For both the full sample period and for the sub-periods, the results from the measurement models showed no statistically significant difference. This means that private investors could have chosen either sustainable or conventional funds during the Covid-19 financial crisis and have expected equal risk-adjusted return.

Keywords: Sustainable funds, Sustainable investments, Covid-19, Risk-adjusted Return, Investments, Environmental, Social, Governance, Sustainability

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Abbreviations

CSR	Corporate Social Responsibility
CO_2e	Carbon dioxide equivalent
DIJA	Dow Jones Industrial Average
ESG	Environmental, Social, and Governance
ETF	Exchange Traded Fund
MPT	Modern Portfolio Theory
PRI	Principles for Responsible Investments
SIFA	Swedish Investment Fund Association
SR	Socially Responsible
SRI	Socially Responsible Investments
US	USA
VIX	Market Volatility Index
WHO	World Health Organization

1. Introduction

Due to the unsustainable lifestyle of humans, the climate crisis has become a more noticeable and critical problem to solve (Nasa, 2020). Human activities which have had effect on the global warming can be traced back to the mid-20th century. The temperature of the planet has risen about 1.14 degrees Celsius since the late 19th century, and since 2014 the six warmest years ever recorded occurred (*ibid*).

The economic growth during the last 50 years have had a substantial negative impact on the climate (Foley, 2007). The economic growth has led to an untenable development of consumption. This consumption now accounts for roughly two-thirds of the greenhouse gas emissions (UN, 2020). To be able to reduce the emissions in accordance with the Paris Agreement it will require a life-style consumption per capita around 2 to 2.5 tons of CO_2e by 2030 and around 0.7 tons by 2050. Today the consumption per capita is 4.55 tons CO_2e. CO_2e is a measurement which measures emissions that affects the global warming. The Paris Agreement is an international treaty to limit the global warming, and is statutory for the participating countries (UNFCCC, 2021). The aim of the agreement is to be climate neutral by midcentury. Many companies and investors have started to give attention to the agreement to be climate neutral, which have created terms as Corporate Social Responsibility (CSR) and Environmental, Social and Governance (ESG).

The term CSR was established in the 1950s and has becoming more important for companies to work actively with. Through CSR, companies can demonstrate for stakeholders how value is created and how the company takes responsibility for environmental and ethical questions (Forbes, 2019). The acceleration of companies establishing CSR comes by pressure from different stakeholders. With pressure from stakeholders', companies must take more responsibility within areas of local development, human rights and creating a sustainable environment. Companies that work active with CSR often get good public relations and marketing (Carrol, 1999). By working actively with CSR, it becomes important for companies to focus on more areas than just being environmentally friendly, it becomes important to focus on ethical and social questions as well (*ibid*).

ESG is a term which states that an equity fund will work to improve or influence environmental, social, and governmental factors within the company it invests in, or to only invest in already sustainable companies (Fondbolagens förening, 2020). When working actively with investments involving ESG, equity funds create conditions to establish better risk management and provide the opportunity for long-term financial return. The term ESG is often referred to as sustainability and in a business context it is how a product or service can contribute to a sustainable future (Nordea, 2021). The environmental aspect imply how companies can reduce their impact on the climate by lowering their greenhouse gas emissions. By highlighting social conditions, businesses can improve the terms of working conditions, labor rights and diversity. Governance serves as a control mechanism, to prevent bribery, corruption, and ensure internal control. Governance is important for companies to provide long-term benefits for shareholders, employees, and the surrounding societies (*ibid*).

Traditionally, investors tend to focus on the financial return of investments, but with growing concerns of environmental issues, the interest for Socially Responsible Investments (SRI) has increased. When investing in SR funds and/or equities, investors now aim to find investment ideas which contribute to both financial return and a sustainable future (Vo, et al. 2019).

In recent years, sustainable investments have increased in popularity in Sweden and in the Scandinavian countries, which have developed into that the Scandinavian countries often are seen as frontrunners for sustainable investments (Fondbolagens förening, 2019a). In 2019, around 33% of the Swedish people who invest in funds, consider it important to invest in funds that focuses on SRI (*ibid*). A reason for the growth of sustainable equity funds in Sweden comes from investors being more focused on their long-term return, which have shifted strategies towards the category of ESG-funds. By focusing on the more long-term return, investors tend to handle disturbance, uncertainty, and financial crises better. Financial crises and uncertainty can come from higher interest rates, problems at banks, governmental problems or as for what this thesis will focus on, a virus spreading globally.

In the end of December 2019, the World Health Organization (WHO) first got information regarding a cluster of cases of pneumonia in Wuhan, China (WHO, 2020). The first response by WHO was to set up an incident management support team to deal with the outbreak and gather more information. The next step was to set up guidelines to advice countries on how to detect and manage potential cases. WHO stated that this pneumonia was a new kind of virus within the coronavirus family and named the virus Covid-19. The first case discovered outside of China was in Thailand on January 13 (*ibid*). The spread of the Covid-19 virus the

following months reached alarming levels all around the globe and on March 11th WHO classified Covid-19 as a pandemic. On March 27th, WHO stated that the confirmed cases had surpassed 500 000 people and the number of cases kept rising (Zhang et al. 2020).

1.1. Problem background

A financial market's function is to facilitate the opportunity for companies to raise capital and find investors willing to invest their capital to get financial return at a certain risk (Brugler et al. 2020). Financial markets have created various opportunities for investors to get financial return on different investment types with varying risk. A popular way of investing money in Sweden is through equity funds (Fondbolagens förening, 2020). Through equity funds investors can easily get a diversified portfolio of equities, managed by a professional fund manager. An equity fund does only invest in stocks, unlike mutual funds which has the possibility to invest in bonds and raw materials. The fund company charges a yearly fee for managing the capital, different funds offer different risk levels and have different strategies (*ibid*). Equity funds can either be *actively managed* or *passively managed*. When a fund is actively managed, a fund manager tries to find investments and strategies to perform higher return than a benchmark index. Passively managed funds, often called index funds, just follows a benchmark index, and tries to generate equal financial return as the benchmark index.

In 1979, the Swedish Investment Fund Association (SIFA) was founded (Fondbolagens förening, 2018). At the time, the Swedish fund market only consisted of 1 billion SEK, roughly 120 million USD[1] (Fondbolagens förening, 2019a). Since then, the market has been growing steadily and in March 2019 the Swedish fund market consisted of roughly 4,423 billion SEK. The increase of capital comes from a high rate of new savings: since 1979 the average new inflow into the Swedish fund market is estimated to be 41 billion SEK per year (*ibid*). Much of this is thanks to the effectiveness of the Swedish fund market, which is characterized by its great transparency and low fees (*ibid*). The favorable conditions for investments in equity funds in Sweden have led to that 8 out of 10 people saves in funds, and if the Swedish pension system is included, almost everyone in Sweden save in funds (*ibid*).

Ethical, sustainable, and responsible funds have become a more popular investment on the Swedish fund market (Fondbolagens förening, 2018). The term sustainable funds or socially responsible (SR) funds is a general term for funds with focus on

[1] 2021-03-14

investments that will improve environmental and societal conditions. Sustainable funds chose its investments through three subcategories, *include*, *exclude* and *influence* (Fondbolagens förening, 2019b). When including they find an investment where the company already works active with sustainability. Excluding, is to not invest in certain sectors with unsustainable business, for example industries as tobacco, weapons, or pornography is excluded. The last category, influence, is to invest with the purpose to improve issues within sustainability and societal questions, such as setting demands for more environmental production or better working conditions for employees. According to Markowitz (1952), these restrictions can create problems for sustainable funds in terms of diversification. Due to the restrictions and the difficulties to diversify, sustainable funds should not be able to perform the same risk-adjusted return as conventional funds. Markowitz (1952) developed the modern portfolio theory (MPT), which is based on the idea that with the correct diversification, it is possible to lower the risk and still achieve the same return (*ibid*). Risk-adjusted return measures the financial return relative to the amount of risk in an investment during a certain period. If two or more investments perform the same financial return during a period, the investment with the lowest risk has the better risk-adjusted return.

The investment bank Morgan Stanley (2021) published a paper where they claim that sustainable funds may potentially have less risk than conventional funds. They claim that sustainable funds might not perform better financial return than conventional funds during normal times, but in periods of uncertainty and high volatility, sustainable funds might be a safer investment with lower risk. In the years 2008, 2009, 2015 and 2018 when there was high turbulence in the financial markets, sustainable funds downside deviation was significantly smaller than conventional funds (*ibid*). Morningstar (2020a) published an article where they examined the difference between sustainable and conventional funds possibility to protect its value against market declines and volatility. The result showed that funds with higher Morningstar sustainability rating were able to protect better towards declines than those with lower ratings. Morningstar's sustainability rating is a measure of the economic risks connected to ESG-issues in a portfolio (Morningstar, 2020b)

When the Covid-19 outbreak started in December 2019 in Wuhan, not many understood how it would affect the world. The consequences from restrictions and uncertainty on how the future would turn out, led to massive declines in stock markets globally, the Swedish broad index OMXSPI peaked on February 19 at 732.67 points, and reached its bottom on March 23 at 478.95 points, which is a fall of 34.6% (SVT, 2020). The OMXSPI index reflects the performance of all stocks listed on the Stockholm exchange. The big American indices such as S&P 500, Nasdaq, and Dow Jones Industrial Average (DJIA) also saw declines in February

and March, the S&P 500 index declined 30%, Nasdaq-100 fell 25% and DJIA declined 34% in this period (Forbes, 2020). The S&P 500 index consist of the 500 leading companies on the US stock market and covers approximately 80% of available market capitalization (SPGlobal, 2021). The Nasdaq-100 index includes the 100 biggest tech companies listed on the US stock market (Nasdaq, 2021a), and the DJIA includes the 30 biggest companies listed on the US stock market (SPGlobal, 2021b). When there is a fall of more than 20% it is considered a bear-market, which is an indication of low investor confidence and sluggish markets (Business Insider, 2020). What happened in March 2020 can be defined as a stock market crash, because of the abrupt falls on major global indices. The volatility on the financial markets was extreme, and the Market volatility Index (VIX) which measures the volatility and uncertainty on the markets reached an all-time high (Nordnet, 2020). The VIX-index usually measures around 20 points in normal times, but in March 2020 when the volatility was extremely high, it reached 82.69 points, which is evidence of extreme fear and uncertainty (Bloomberg, 2020).

For the American stock market, the period of the Covid-19 stock market crash is dated between February 24th and March 18th. This is because most of the American indices peaked in February, and on March 18th the US President Trump launched a second financial stimulus package. Which was a start of an aggressive fiscal and monetary response to the economic situation caused by the pandemic (Albuqurque et al. 2020). The recovery of the Swedish indices took a couple of more days, OMXSPI started its recovery on March 24th (SVT, 2020).

Previous studies examining the difference in performance between sustainable and conventional equity funds have reached different results. The papers from Hamilton et al. (1993), Mallin et al. (1995), Bauer et al. (2005), Kreander et al. (2005) and Chang et *al* (2012) have all evaluated the difference in performance during longer sets of periods. The study by Hamilton et al. (1993), covering the period between 1981 and 1990, reached the result that sustainable and conventional funds performed equal. When Mallin et al. (1995) performed an examination of the two categories between 1986 and 1993 the result was that sustainable funds did outperform the conventional funds in terms of risk-adjusted return. Kreander et al. (2005) performed an extended examination of Mallin et al's. (1995) study, to give knowledge on how sustainable and conventional funds on the European market have performed. The result from this study showed that in the period between 1995 to 2001 there was no difference in risk-adjusted return. Bauer et al. (2005) evaluated the difference between sustainable and conventional funds in risk-adjusted return between 1990 and 2001, the study showed no difference in risk-adjusted return between the two categories. The study by Chang et al. (2012) reached the

conclusion that sustainable funds underperformed conventional funds in terms of risk-adjusted return.

To understand why some, consider sustainable funds to be a safer option than conventional funds, the ESG-risk must be evaluated. Jin (2018) states that the risk connected to ESG, is already priced in the equity and that equity funds on the US market tend to secure the ESG-related risk. Hübel and Scholz (2019) examined how the ESG-risk affected sustainable funds in the period 2003 - 2016 and concluded that sustainable funds often performed better than conventional funds during recessions. When Nofsinger & Varma (2012) examined how sustainable funds performed during the period between 2000 to 2011, they found that sustainable funds often underperformed conventional funds during normal market conditions, but when there was high uncertainty, the sustainable funds became a more interesting investment and outperformed its peers.

These previous studies are interesting when examining how sustainable and conventional funds differed in risk-adjusted return during the Covid-19 market crash. There is a lack of studies examining the difference in performance between sustainable and conventional equity funds on the Swedish fund market during the Covid-19 crisis. There are some studies examining the difference in performance on a global scale and other markets. For example, Ferriani & Natoli (2020), examined how the inflow of capital on a global scale from investors in sustainable funds were before, during and after the Covid-19 market crash. The result from the study showed that the funds with high ESG-rating performed well and that investors belief in sustainable funds were strong during the crash. In another study on the subject by Folger-Laronde et al. (2020), where they examined how sustainable exchange traded funds (ETF), performed during the Covid-19 market crash. ETF:s is a similar investment type as equity funds. The study on the Canadian market of ETF:s, reached the result that just because an investment has a higher sustainability rating it is not a safeguard towards losses and declines. When Pástor & Vorsatz (2020) performed a study on equity funds on the US market, the authors found that equity funds with a higher Morningstar sustainability rating were able to perform better during the Covid-19 market crash.

It is interesting to look at these previous studies when examining the difference in risk-adjusted return between sustainable and conventional funds during the Covid-19 market crash. This is due to that many of the studies before the pandemic only examines the two fund categories for longer sets of periods, and the results vary depending on which countries the studies examine. The studies which are examining sustainable and conventional funds during the Covid-19 market crash, tend to focus on the US market or globally. Given that no previous research has

focused on how Swedish equity funds perform in risk-adjusted return during the crash, it becomes interesting to study the issue. It is also interesting to examine the difference in risk-adjusted return between sustainable and conventional funds due to how Sweden is seen as frontrunners for sustainable investments (McCallin & Webb, 2004) and because of the large numbers of people in Sweden who invest in funds (Fondbolagens förening, 2018).

1.2. Research aim and research questions

This study aims to examine how the risk-adjusted return differed between sustainable and conventional equity funds on the Swedish fund market during the year 2020. This is to give an understanding of how sustainable and conventional equity funds were affected in risk-adjusted return because of the Covid-19 financial market crash. To examine the performance in risk-adjusted return, the funds are examined during the full sample period between January 1, 2020, to December 31, 2020 and with three sub-periods. The three sub-periods for examination are the following:

20-01-01 – 20-02-19
20-02-20 – 20-03-23
20-03-24 – 20-10-05

The reason for sub-periods is to develop knowledge on how the funds performed before, during and after the crash. The recovery of the funds will be measured in reflection to the recovery of the OMXSPI index.

The thesis has the following research questions:

- Was there any difference in risk-adjusted return between sustainable and conventional equity funds during the Covid-19 financial market crash?
- Were sustainable funds able to perform higher risk-adjusted return during the period of recovery?

The period of recovery for sustainable and conventional funds is measured from when the OMXSPI reached its bottom in 2020, to when it recovered back to the same levels as before the crash. Collected empirical data from a secondary source will be used in combination with various calculation methods to answer the research questions and reach the aim.

1.3. Delimitations

In this thesis only equity funds on the Swedish fund market are examined, and equity funds from other countries are excluded. This is because of the lack of studies examining the Swedish fund market during the Covid-19 financial crisis. The funds examined have a minimum of 80 percentage of its assets in Swedish companies, this is to keep the data sample wide enough to get a valid result. The reason for a minimum of 80 percent is to correctly analyze the performance and risk-adjusted return in equity funds that operates on the Swedish fund market. All funds in this study are pure equity funds because the aim is to examine how funds that invest in Swedish companies performed before, during and after the Covid-19 market crash. All data used to calculate the risk-adjusted return and other variables will be collected from secondary sources, and there will be no surveys or interviews in the study.

2. Theoretical framework and literature review

This chapter presents relevant concepts, theories, and literature review for the current study.

2.1. Financial Return and risk-adjusted return

When measuring the return of a fund, one needs to consider how much dividends the underlying securities have paid and how the value of the underlying equities has changed (Simons, 1998). The dividends paid by the underlying security is added to the funds' return. The net return of a fund is calculated after management fees and other expenses that affects the funds return. For investors, it is not only interesting to measure the financial return of different funds, but also to measure what risk the fund contains. A type of risk is the uncertainty of the expected return and is generally equal to the volatility of the funds' performance. When there is higher risk, investors demand higher returns, which indicates that variability and risk are related (*ibid*). The most common way to calculate the variability of a funds' return is to use standard deviation. Standard deviation measures the fund's variability over a chosen period. Standard deviation can also be referred to as volatility.

By combining return, standard deviation and other factors it is possible to measure the risk-adjusted return. When two funds have equal return over a period, it is possible that one of them have a lower risk-adjusted return. This is due to the standard deviation and other factors might be different between the funds (Scholz & Wilkens, 2005). When calculating the risk-adjusted return, the risk can be measured in different forms, it can be the measured in difference in standard deviation, how the fund performs relative to the benchmark index, or how it handles downside risk. Risk itself can be divided into two categories, it can either be *systematic risk*, or *unsystematic risk*. Systematic risk is uncontrollable in nature, and arise out of external factors, such as geopolitical, economical, and sociological factors (Bauer et al. 2005). Unsystematic risk is associated with specific investments and is affected by specific companies or industries and can be reduced by diversifying assets in a portfolio.

2.2. Modern portfolio theory (MPT)

The Modern Portfolio Theory (MPT) was published in 1952 by Harry Markowitz in The Journal of Finance. Markowitz claims that the process of selecting a portfolio can be divided into two stages (Markowitz, 1952). The first stage of selection is based out of the investor's own observations and experiences and what the expectations are on the financial return. The second stage starts with the beliefs concerning the expected return and ends with selecting a portfolio. The MPT has two key assumptions, i.e., that every investor wants the highest possible return with the lowest possible risk and that all investors have full rational information for their respectively investments (Markowitz, 1952). According to Schulmerich et al. (2014), these two assumptions from Markowitz (1952) are idealized and unrealistic, because not all investors can get full rational information to base decisions on. Schulmerich et al. (2014), state that the assumptions are still interesting and useful when evaluating portfolios, the assumptions can be made a bit more relaxed, so they become more applicable. Markowitz (1952) claims that if an investor faces two different investment opportunities with the same rate of return but different rate of risk, the investor will always rationally choose the investment with lower risk. According to the theory, when there is higher risk in an investment the investor expects to get higher return.

In the article, Markowitz (1952) proposes that investors can reduce the risk in a portfolio by holding different combinations of assets or equities that are not perfectly positively correlated. By doing so, the portfolio of assets will be diversified, and the risk lowered. The diversification should be done by investing in assets which operates in different industries, and therefore the sensitivity to fluctuations be lowered (Markowitz, 1952). This means that the MPT proposes that the assets in a portfolio should consist of different unrelated equities, to lower the risk. For investors, the relationship between risk and return can be optimized to give the highest return possible at a given certain risk level. In Markowitz (1952) article, he states that there should be no direct covariance between equities in a portfolio to achieve an optimized risk-adjusted return, this can be optimized by investing in different industries, that has different economical characters and therefore lower the covariance. The theory can easily be applied by private investors who wants to diversify their fund portfolio, because of the amount of different funds that exists. This will lower the risk for investors and maximize the financial return on the invested capital. Markowitz (1952) states that even with a well-diversified portfolio of equities in different industries, there might be fluctuations because of how different industries are dependent on each other.

The MPT is an important theory on how investors can construct portfolios to maximize the expected return given a certain level of risk. The theory is used in

many other models, and it is therefore the author of this thesis considers it important to include it to strengthen the background and understanding of the theories used to calculate the risk-adjusted return.

2.3. Definition of sustainable funds

The fund company Blackrock (2021) defines sustainable investments as something that will push forward the progress and give recognition to companies that endeavors to improve sustainable environments. Fondbolagens förening (2021) states that sustainable funds should invest with the aim of creating a better world and have a positive effect on society and its environment. The Swedish pension authority defines sustainable equity funds as responsible investments that strives to improve the worlds sustainability and improve environmental, societal, and governmental questions (Pensionsmyndigheten, 2021).

In a sustainable fund's investment process, the fund takes in consideration of how the investment may have any social or environmental consequences, both positive and negative (Pérez-Gladish, et al. 2012). The fund needs to both evaluate the financial performance of companies and understand how they work with CSR. Sustainable funds can either adopt a *positive approach* or a *negative approach*. When adopting a positive approach, the fund includes companies who are not sustainable, but the fund has the goal to influence and amend the sustainability work within the invested company. When having a negative approach, the fund excludes non-sustainable companies and only invests in companies with already sustainable working methods. In 2005, more than 80% of all funds had a negative (exclusionary) approach, but with the upcoming trend of sustainable funds, more and more funds use a positive (inclusionary) approach (*ibid*).

The UN has set up an initiative named Principles for Responsible Investments (PRI), which is a voluntary and ambitious set of investment principles for sustainable funds to follow and to how take ESG issues in consideration when investing (PRI, 2021). The principles guide equity funds to invest in companies which aims to create a positive effect on society whilst giving financial return to its investors (*ibid*). When investing its capital, a sustainable fund must take environmental issues into consideration, as how the company works with waste management, pollution etc. (Nordea, 2021). The investment should ensure that companies either take care or improve the conditions for its employees and the surrounding community (*ibid*). The governance criteria means that the investment should improve the work against bribery, corruption and other negative aspects connected to governance. The governance factors should act for long-term benefits for shareholders, employees, and society.

2.4. Morningstar sustainability rating (MSR)

The Morningstar Sustainability Rating (MSR) is a rating system which is based on a collaboration with the company Sustainalyctics, which analyzes other companies' sustainability work based on the ESG factors (Morningstar, 2020b). Sustainalyctics is a leading company in the sector of evaluating companies' ESG-work, they analyze more than 10,000 global companies (*ibid*). Sustainalyctics analyze and rate individual companies with ESG-risk ratings, the ratings are then used by Morningstar to rate the funds ESG-risk. The ESG-risk rating by Sustainalyctics measures to what extent a company's financial value may be at risk from ESG events (*ibid*). For an ESG event to be a risk, it must have potentially significant impact on a company's economic value and therefore have impact on the expected return in relation to the risk level of an investment in the company.

The ESG risk rating varies between different industries and companies. The ESG rating done by Sustainalyctics are on a scale of 0 - 100, the lower the score, the better (Morningstar, 2020b). With the data from Sustainalyctics and other variables, Morningstar combines this for all companies within a fund on a 12-month average ESG-risk, to decide what the MSR for the fund will be. The MSR goes from one to five, symbolized by globes. One globe on the Sustainability rating is considered worst, and a five-globe rating is considered best.

2.5. Literature review

In this thesis, the difference in risk-adjusted return between sustainable and conventional equity funds is examined. The examination period is before, during and after the Covid-19 market crash. It is therefore interesting to summarize what previous studies have concluded considering financial performance in equity funds.

2.5.1. Difference in performance

Previous studies examine the difference in financial performance between sustainable and conventional funds have mostly been performed during longer sets of periods. In papers from Hamilton et al. (1993), Mallin et al. (1995), Bauer et al. (2005), Kreander et al. (2005), and Renneboog et al. (2008), the studies examined different fund markets over a longer period.

Hamilton et al. (1993) used single-factor models such as the CAPM and Jensen's alpha to examine if there was any difference in excess return between US SR funds and US conventional funds. Hamilton et al. (1993) examined the funds in the period between 1981 to 1990 with the result showing no statistical difference in return

between the fund categories and came with the conclusion that investors do not suffer financially by investing sustainable.

In a later study performed by Mallin et al. (1995) a matched pair approach of ethical and non-ethical funds on the UK market was used. Matched pair analysis lets the author select funds from each category that matches with each other in factors such as age, size, and other characteristics for the funds. The matched pair analysis is used to ensure that the difference in performance was not affected by external factors. The study matched 29 pairs, 58 funds in total, of ethical and non-ethical funds based on size and age. The study examined the funds' return by using the Sharpe ratio, Treynor ratio and Jensen's alpha, these ratios will be described later in this thesis. As well as comparing the matched pairs with each other, the study also measured the two fund categories compared to a benchmark index reflecting the performance of UK stocks. The initial analyzes found that the mean return of ethical funds appeared to underperform both non-ethical funds and the market, the study also claims that there is weak evidence that non-ethical funds outperform the market in this sample. When Mallin et al. (1995) compared the risk-adjusted return between the two categories they found that both fund categories underperformed compared to the benchmark index. When comparing the risk-adjusted return of the two fund categories with each other, the sustainable funds in the sample tended to outperform the non-ethical funds. Jensen's alpha was the measurement which was most indicative of superior performance and with all three measurements i.e., Jensen, Treynor and Sharpe, the ethical funds outperformed the non-ethical funds. The authors end the paper by stating that the outperformance by sustainable funds might be a temporary phenomenon caused by increased interest in ethical investments (*ibid*).

In more recent literature, different multi-factor models have been used to measure the risk-adjusted return. Multi-factor models use several different systematic risks to provide a better understanding how different funds perform (Fama & French, 1993: Carhart, 1997). Systematic risk is the reflection in the market that is affected by economic, geo-political and financial factors. Bauer et al. (2005) performed one of the first studies using the Carhart model to analyze different funds' performance. In their study they examined the performance of 103 ethical funds compared to 4,383 conventional funds in Germany, UK, and US in the period between 1990 to 2001. In addition to the Carhart model they used CAPM and Jensen's alpha to analyze the data. In the study from Bauer et al. (2005) they found no statistically significant difference in risk-adjusted return when evaluating sustainable and conventional funds. In addition to the full period 1990 to 2001, the study used three sub-periods between the years 1990 to 1993, 1994 to 1997 and 1998 to 2001 which showed how sustainable funds underperformed conventional funds in the beginning

of the 90s but performed matching risk-adjusted returns to the conventional funds during the period of 1998 to 2001.

An expansion of Bauer et al's. (2005) study came in 2008, when Renneboog et al. (2008) examined all sustainable funds data available in the world in the period 1991 to 2003. The study concludes that most of the sustainable funds underperformed their domestic benchmarks by several percentage points annually. Though, when the authors measured the risk-adjusted return, most of the sustainable funds in the study showed no statistical difference from conventional funds. The exceptions in statistical difference in risk-adjusted return were in France, Japan, and Sweden, where the SRI funds had lower risk-adjusted returns.

In a paper by Kreander et al. (2005), the performance of 60 European funds from four countries were examined. Kreander et al. (2005) used matched pair analysis to select funds and ended up with 30 conventional funds and 30 sustainable funds. Their study covers the period between 1995 and 2001. The paper is an extension of the study on the UK market from Mallin et al. (1995). The paper aims to give knowledge on how sustainable funds have performed on the European market. The study examines sustainable funds from the UK, Germany, the Netherlands, and Sweden. When evaluating the funds' performance, the paper analyzes risk-adjusted return with the Treynor ratio, Sharpe ratio, and Jensen's alpha. The study from Kreander et al. (2005) reached the result that there was no difference between the two fund categories in risk-adjusted return when using the Treynor's ratio, Sharpe ratio and Jensen's alpha.

Chang et al. (2012) compared 131 sustainable funds with the average of all conventional funds on the US market. The study examined the risk-adjusted return of the funds by using data from the period of 1997 to 2012. To compare the two fund categories Chang et al. (2012) compared the annualized rates of return and the difference between the Sharpe ratios. The result from the study concluded that sustainable funds had generated lower return than conventional funds with the same risk, which means that sustainable funds had underperformed on a risk-adjusted basis.

2.5.2. ESG-risk

Jin (2018) examined how ESG-investments consist of a systematic risk for equity funds. Jin (2018) applied the Fama and French five-factor evaluation model in combination with ESG factors on 1,425 US equity funds to evaluate how the funds differ in risk and return. The Fama and French five-factor is an evaluation model which expands from the capital asset pricing model (which is explained later in the thesis). The model adds risk connected to size of the fund and value risk factors to

the market risk factors. The paper by Jin (2018) reached the conclusion that equity funds tended to secure the ESG-related systematic risk, to protect the downside. The result from the study showed that exposure towards ESG-related risk is significantly priced into the market and that equity funds have become more capable to reckon CSR into their investment decisions.

Hübel and Scholz (2019) state in their study on the European stock market that it is hard to reduce the risk linked to ESG factors by diversifying the portfolio. They claim that it is more important for investors to understand how different ESG profiles and portfolios will affect their portfolio, and how the risk will differ. They indicate that there is a lack of comparable, easily accessible quantitative ESG data with high quality, which makes the integration of ESG portfolios slower. In their findings when studying samples of European stocks between 2003 and 2016, they find that during recessions in financial markets, there is a "flight to quality" (Hübel & Scholz, 2019:3), which indicates a greater inflow to sustainable funds.

When financial markets are stable, and no uncertainty is threatening the situation, sustainable funds tend to underperform comparing to conventional funds. (Nofsinger & Varma, 2012). However, when there is market crisis and a high level of uncertainty it seems that sustainable funds outperform conventional funds. The cost of outperforming the conventional funds during market crisis comes from being outperformed by conventional funds during normal times according to Nofsinger & Varma (2012). Nofsinger & Varma (2012) state that sustainable investments can damper the downside risk because ESG companies are less likely to suffer from large negative events in both positive and negative market scenarios. In their article they claim that the sustainable investments lower the risk by having less legal prosecutions and maintaining a stable relationship with communities and governments. To be able to examine this, Nofsinger & Varma (2012) used a unique dataset of US domestic equity SRI funds and investigated the performance during the period between year 2000 to the year 2011. To calculate the risk-adjusted return of sustainable and conventional funds, they used a variety of evaluation methods.

2.5.3. Sustainable funds during Covid-19

Ferriani and Natoli (2020) published a paper where they examined how inflow of capital into funds changed globally during the Covid-19 market crash. In their paper they investigate how the inflow into equity funds differed between funds with low and high ESG-risk ratings. They used the Morningstar ESG-risk rating indicators to select funds for examination. The Morningstar ESG-risk rating measurement is a tool created by Morningstar to rate how sustainable a fund is. They measured the risk before the Covid-19 crash, during the crash and afterwards how the recovery turned out. When measuring before the crash, they set the dates between January

20th to February 21st, when markets still were increasing in value amid mounting evidence of the spread of the Covid-19 virus. They set the crash to be between February 24th to March 27th when the uncertainty in the markets were high and concurred with the WHO assessment of Covid-19 as a pandemic. They set the recovery of the market to be between March 30th to May 1st, because the initial recovery of the global financial markets. This published paper can be considered a complement to the Nofsinger & Varma (2012) article on the risk in ESG-funds and how the risk can be lower during times of high uncertainty. The conclusion from Ferriani and Natoli's (2020) paper is that funds with lower risk towards ESG had a greater inflow of capital, especially after the crash. The paper states that when social and governmental factors were under stress, the environmental preference for investors remained strong.

Folger-Laronde et al. (2020), examined the performance of sustainable and conventional ETF:s on the Canadian market during the Covid-19 crisis. ETF:s is an investment type very similar to equity funds. The study both examined the financial performance, and the sustainable investment's ability to remain stable during turmoil and uncertainty on financial markets. The study examined 278 different ETF:s with varying sustainability ratings from Corporate Knights, a research firm providing ratings for SR investments. Folger-Laronde et al. (2020) determined the start of the Covid-19 financial crash to be February 20th, because many of the big global indices experienced major declines. They set the end of the crash to March 3, to match the S&P/TSX Composite Index, an index which represents 70% of the listed stocks on the Canadian market. When the authors evaluated the financial performance of the ETF:s, they first examined the financial performance before Covid-19, and then the performance during the market crash. The result from the study indicates that a higher level of sustainability in an investment do not give safeguard against investment losses and declines in the financial markets.

Pástor & Vorsatz (2020) performed a comprehensive study on US actively managed equity funds during the Covid-19 crisis. The aim of the study is to see if the actively managed funds, often with higher management fees, were able to perform better than the passive index funds during a market crash. They used data from 4,292 different funds on the US market to evaluate the performance. With data from Morningstar, the authors sorted out funds depending on categories, alignments, and sustainability ratings. The funds were evaluated between February 20 to April 30, 2020, they chose this period because the stock market peaked on February 20 and chose April 30 as the end because it puts the market bottom on March 23 roughly in the middle of the crisis period (*ibid*). To compare the funds' performance the authors used the S&P 500 Index, to see if the actively managed funds were able to outperform the broad index. The result from the study showed that active funds did

underperform the passive index funds as well as the benchmark index, S&P 500. In the results from the study, the authors found that funds with higher MSR, were able to perform higher returns during the Covid-19 crash.

2.6. Hypothesis formulation

In previous studies, when evaluating the difference in performance between sustainable and conventional funds, the results have differed. In the studies from Hamilton et al. (1993) Kreander et al. (2005) and Renneboog et al. (2008) the result showed no difference in risk-adjusted return between sustainable and conventional funds. In the paper from Mallin et al. (1995) the result was that sustainable funds had higher risk-adjusted return than conventional funds, and the paper from Chang et al. (2012) reached the conclusion that sustainable funds underperformed the conventional funds in risk-adjusted return.

Norsinger & Varma (2012) stated that sustainable funds tend to underperform during normal times and outperform its peers during financial criseis. Hübel and Scholz (2019) reached a similar result in their study, i.e., that sustainable funds tend to perform better than conventional funds during times of uncertainty. The study from Pástor & Vorsatz (2020), had the result that equity funds with higher MSR were able to perform better during the Covid-19 market crash, than those with lower MSR. Given this, the thesis first hypothesis is formulated:

H1: Sustainable funds performed higher risk-adjusted return than conventional funds during the full year of 2020.

In the paper from Ferriani and Natoli (2020) they state that funds with higher ESG-rating were able to recover better after the Covid-19 financial crash, which establish the formulation of the second hypothesis:

H2: Sustainable funds performed higher risk-adjusted return during the third sub-period between 2020-03-24 – 2020-10-05.

3. Method

This chapter describes and argues for the approach and methodology used in this thesis to answer the research questions and reach the aim. In this chapter the evaluation models to analyze the data is described.

3.1. Research design

When writing a thesis there are two strategic approaches: The author can either use a *qualitative approach* or a *quantitative approach* (Bryman & Bell, 2015). Both methodologies aim to strengthen or generate theories through empirical data collection. The research methodologies differ on how they approach the research question, with a qualitative approach the focus is mainly on words and description and a quantitative approach it is more focused on numbers. When using a quantitative approach, it is suitable to have a *deductive approach* towards the relationship between theory and empirics (*ibid*). The function of a deductive approach is to test a theory on a hypothesis and is more suitable for quantitative studies. With a quantitative method the empirical data is quantified to be able to analyze and transform the data into graphs and diagrams. With a qualitative approach, the focus is on the words that have been collected through interviews with respondents. When using a qualitative method is more suitable to have an *inductive approach* towards the relationship between theory and empirics.

This thesis uses a quantitative methodology with a deductive approach because of the need to compare risk-adjusted return between sustainable and conventional funds and hence be able to answer the research questions and reach the aim. The study uses secondary data to examine how sustainable funds and conventional funds differed in risk-adjusted return during the Covid-19 market crash, and there will be no surveys or interviews in the study. The most suitable way to evaluate the risk-adjusted return for the funds, is to look and evaluate historical returns. Because of this, the study is not suitable to be based on a qualitative approach. All previous studies examining similar topics, use quantitative methods to calculate results by using secondary sources and already tested evaluation methods. As mentioned above the study will only use secondary data which will be of an advantage because of the simplicity to find sources and collect data. It will also be more efficient to use secondary data than collect the data on your own, because it is less time

consuming (Bryman & Bell, 2015). A disadvantage with using secondary data is that the data might not contain enough information to give answer to the research question. Another problem with secondary data is that the author does not have full control over the data set. The study will be founded on scientific research, articles and published papers combined with theories.

3.2. Literature review

The foundation of this study is its literature review which focuses on sustainable and conventional funds and how they differ in performance and style. Through the literature review the study will find gaps in previous studies and be able to analyze the gap. It is highly important to establish a proper literature review according to Bryman & Bell (2015). The literature review also provides a deeper understanding and breadth to the research subject, which makes it possible for the author to find angles in previous research that has not been explored. During the literature review the author of this thesis found that there has been no to little previous research that compare the performance between sustainable and conventional funds on the Swedish fund market during the Covid-19 financial crisis.

When performing a literature review and when searching for previous studies, either a *narrative review* or a *systematic review* can be used (Bryman & Bell, 2015). When using a narrative review, the literature review has a broader search spectrum and is less focused, the author will not specifically search to find the exact answer to the research questions (*ibid*). The systematic review, on the other hand, is more concentrated and is preferably used when the author wants to find the answer to a specific question. In this study it is suitable to use a narrative literature review because the need of a broad search to develop knowledge on the subject. In this thesis, it is also suitable for a narrative review because of the many studies on the subject with different results. To be able to perform a study on how Swedish sustainable funds have performed during the Covid-19 financial crisis, it is important to understand what defines a sustainable fund and how risk-adjusted return is determined. During the literature review, it became clear that most of the previous studies examining how the two fund types differ in risk-adjusted performance is focused on the American market or globally in total. Even as Sweden is considered a frontrunner within sustainable investments, there is a lack of comprehensive studies on how the Swedish funds performs during recessions and crises.

The literature in this thesis is based on scientific articles, reports, and books. The literature was obtained on the academic databases Primo and Google Scholar. Searches are done in English and Swedish to reach a broader understanding,

specifically searches in Swedish is done to obtain greater understanding on the Swedish Fund market.

3.3. Data collection

For this study, the data used to evaluate the performance of the funds is collected from secondary sources. The secondary data for the equity funds is collected from Investing.com. Investing.com is a global platform for financial markets and provides real-time data for 300,000 financial instruments (Investing.com, 2021). The reason why Investing.com is used is because of the large sets of data available for sustainable and conventional funds, and for the simplicity to analyze the data. A disadvantage with using Investing.com for data collection, is that the data is collected as a csv-file, which means that the file uses comma separated values, instead of being separated with dots as a regular Excel-file. This requires that the data must be modified for commas and transformed into an excel-file. When collecting the data there is no possibility to download all data at once, which requires a lot of work to transform and extract the useful data into the correct format. In combination with data collection from Investing.com, Morningstar has been used to sort out which funds that is suitable for this study. Morningstar does provide information regarding sustainability rating, risk, standard deviation, and other necessary information regarding funds.

The data collected from Investing.com consists of the funds rolling day yield and the daily net asset value. An equity fund's net asset value is calculated by dividing the fund's assets with the fund units (Avanza, 2021). If the fund's assets fall or rise in value, the net asset value will also fall or rise. The net asset value determines what the price is to buy one unit of the fund.

Data for the OMXSPI is collected from Nasdaq's Swedish webpage nasdaqomxnordic.com (Nasdaq, 2021), and the data for the Swedish monthly treasury bills are collected from The Swedish National Banks webpage (Riksbanken, 2021).

During the collection of data for the equity funds, it was found that for some of the funds, data was missing on different dates in the full sample period. This was corrected by screening all data and adjusting the dates in the data sample. Each of the fund's data contains 245 observations for the full set of periods.

3.4. Selection of sustainable and conventional equity funds

The study examines how sustainable and conventional funds differed in risk-adjusted return during the year 2020, with the effects from the Covid-19 crisis. The funds chosen in the thesis, are chosen to reflect the overall risk-adjusted return for sustainable and conventional equity funds on the Swedish fund market before, during and after the Covid-19 market crash. The funds are examined in different periods, but with the main period of examination is between 2020-01-01 and 2020-12-31. The use of sub-periods is necessary to be able to analyze how the funds performed in the different stages of the crisis and how they were able to recover afterwards.

The three sub-periods for examination are the following:

- 20-01-01 – 20-02-19 Before the crash
- 20-02-20 – 20-03-23 During the crash
- 20-03-24 – 20-10-05 Recovery after the crash

The main period during the full year will be used to give an overview on how the funds have performed during the year. The use of sub-periods is necessary to examine the different steps of the crisis. The first sub-period is set in the beginning of the year, when the Covid-19 virus had not started to spread, and the uncertainty were low on the Swedish financial markets. This period is useful to evaluate how the funds perform during normal times. The second sub-period is set between February 20th to March 23rd, because the index OMXSPI reached its top on February 20, and the index reached its bottom on March 23. It is therefore interesting to evaluate the funds' performance during this period. The last sub-period is set between March 24 and October 5, this is to examine how the funds recovered after the crash. The use of the sub-periods in the study is to analyze the change of risk and volatility in the market, and the sub-periods will help to create deeper knowledge of how the funds recovered during the year. Sub-periods were also used in studies by Ferriani & Natoli (2020) and Folger-Laronde et al. (2020) to measure how the different funds developed during the Covid-19 financial crisis. Ferriani & Natoli (2020) and Folger-Laronde et al. (2020) had help from the sub-periods to create better knowledge on how funds were affected by the Covid-19 financial crash.

The funds chosen to be examined in this study are based on their MSR. In previous studies (Ferriani & Natoli, 2020; Pástor & Vorzats, 2020) conventional funds are categorized with the rating of 1-3 MSG and sustainable funds is categorized with

the rating of 4-5 MSG. The funds are chosen to be matched pairs, which means that funds from each category should match with each other with investments into similar industries and have similar net asset values.

The screening of sustainable funds has been done through Morningstar and the funds have been selected based on their MSR and size. Only funds with the rating of 4 to 5 sustainable globes have been chosen as sustainable funds. The reason for the selection of 4 to 5 is because there are too few equity funds on the Swedish fund market with the highest rating and most of its assets in Swedish equities. Ten equity funds were chosen to represent the sustainable category. Some funds with higher ratings have been deselected because the size of the fund is too small to be matched. The smallest sustainable fund in the study has assets worth of 2,237 million SEK on the observation day (2021-03-02), the biggest fund in size has assets worth of 37,666 million SEK on the observation day (2021-03-02). The average size of the funds is 21,034 million SEK.

As mentioned above, in this study the conventional funds are categorized in accordance with previous studies at the rating 1 to 3 sustainability globes. As for the sustainable funds, the conventional funds have been screened from Morningstar and selected based on the MSR and the size of the fund. Ten conventional funds were chosen to represent the conventional category. The smallest fund has a size of 1,880 million SEK on the observation day (2021-03-02) and the largest 38,546 million SEK on the observation day (2021-03-02). The average size of the funds is 17,300 million SEK.

3.5. Evaluation models

This section describes the models used to evaluate and measure risk-adjusted return for the funds. Several different evaluation models were found in the literature review which will be used to analyze the performance of both sustainable and conventional funds. In previous studies with similar subjects, the most used evaluation models are the Sharpe ratio, the Treynor ratio and Jensen's alpha (Brealey et al. 2019).

3.5.1. Standard deviation

Standard deviation is a statistic measurement that calculates the amount of variation in a data set, and how much it has dispersed from the mean value of the whole data set (Chang, et al. 2012). The use of standard deviation is commonly used to forecast future performance of funds with historical data. A fund with a high standard deviation indicates higher risk and a more unpredictable future, in contrast to a fund

with lower standard deviation that indicates a lower risk and a bit more predictable performance in the future (*ibid*). Standard deviation is often used by investors when evaluating a fund's performance compared to the average return of a benchmark index. This study will use the standard deviation to measure the variation in return on the daily average return from sustainable and conventional funds. By calculating the standard deviation for each of the funds, it is possible to compare variability between them. Standard deviation is used in this thesis to calculate different measurement ratios.

The following formula is used to calculate the standard deviation:

$$S = \sqrt{\sum(x - \tilde{x})^2 \div (n - 1)}$$

Where:
S = Standard deviation
x = Return
$\bar{x}$ = Mean value of return
n = Number of observations

3.5.2. The Sharpe ratio

The Sharpe ratio is a measure of risk-adjusted return for a certain asset or portfolio, in this study multiple funds (Sharpe, 1964). The Sharpe ratio uses standard deviation to calculate how much of return that can be expected by adding an extra unit of risk. When comparing the historical performance of two funds, the fund with the highest Sharpe ratio is the one with the highest risk-adjusted return (*ibid*). According to Brealey et al. (2019), the Sharpe ratio is one of the most used measurement when evaluating the performance of funds, which makes it suitable to use it in this thesis. By using the Sharpe ratio, the evaluation takes both systematic and unsystematic risk into account.

The following formula will be used to compute the Sharpe ratio:

$$S_i = \frac{r_{i-r_f}}{\sigma_i}$$

Where:
Si = Sharpe ratio of assets
ri = Return of asset
rf = Risk-free rate
σi = Standard deviation of asset

3.5.3. The Treynor ratio

The Treynor ratio was developed in 1965 by Jack Treynor and is similar to the Sharpe Ratio: Both ratios measure the difference in risk-adjusted return of funds compared to the risk-free rate (Braeley et al. 2019). The Treynor ratio measures the excess return a fund acquires for each unit of extra risk that the fund is willing to take. Unlike the Sharpe ratio, which uses standard deviation to measure risk, the Treynor ratio uses a beta coefficient to measure the risk-adjusted return (Treynor, 1965). By using the beta coefficient, the ratio only takes the systematic risk into account when measuring risk-adjusted return. The beta coefficient measures the volatility of a fund in comparison to the benchmark index. This study uses the Treynor ratio to see the relationship between systematic risk and financial return. The fund that scores the highest on the Treynor ratio, have the highest return risk-adjusted return (Treynor, 1965).

The following formula will be used to compute the beta coefficient:

$$\beta = \frac{Covariance\ (R_e, R_m)}{Variance\ (R_m)}$$

Where:
β = The beta coefficient
R_e = Return on the fund
R_m= Return on the overall market
Covariance = How the return in the fund is related to the overall market
Variance = How far the market's data points spread out from their average value

The following formula will be used to compute the Treynor ratio:

$$T_i = \frac{r_i - r_f}{\beta_i}$$

Where:
Ti = The Treynor ratio of the asset
ri = Return of the asset
rf = The risk-free rate
βi = The market exposure of the asset

3.5.4. Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) is an equilibrium model developed by Sharpe (1964) and is a development from Markowitz (1952) MPT. The model calculates the required return of an asset with the variables expected return and risk during a period. The CAPM derives that there is a connection between systematic risk and the expected return and claims that it is possible to reduce risk by diversifying, though not all risk can be eliminated. When investors are willing to take a higher systematic risk, they are compensated with higher expected return, which Sharpe (1964) notes in his model where the measurement of beta reflects the sensitivity in an asset relative to the market. The beta coefficient is a risk measure which shows how much an asset have fluctuated historically in relative to the market (Avanza, 2021). The beta coefficient shows the volatility in a fund in relation to the volatility of the market. If the beta coefficient is equal to one, the fund is on the same risk level as the benchmark index for the fund, funds with higher beta is considered to have higher risk. Investors use the CAPM to find out if a fund is correctly valued at a given risk and what the predicted return will be. The CAPM measure will be used in this thesis to compute the measurement model Jensen's alpha.

To compute CAPM the following formula will be used:

$$E(r_i) = r_f + \beta_i \cdot \left(E(r_m) - r_f\right)$$

Where:
$E(ri)$ = Expected return of the security
rf = The risk-free rate
βi= The market exposure of the asset
$E(rm)$= The expected return of the market

3.5.5. The Jensen's alpha

The Jensen's alpha is a measurement ratio developed from CAPM and is based on the same assumptions (Jensen, 1968), and is a further development from Markowitz (1952) MPT. Michael Jensen developed Jensen's alpha in 1967 to compare the performance of funds with the market. The Jensen's alpha is the risk-adjusted return which is predicted from CAPM given that the portfolio's beta value and market development is known (Jensen, 1968). Jensen's alpha measures the risk-adjusted performance which is then used to measure the actual return and predict the possible future return of the fund (Brealey et al. 2019).

When calculating Jensen's alpha for a fund, if the result gives a positive alpha, it means that the fund outperformed the prediction, and a negative alpha indicates that the fund underperformed the prediction (Jensen, 1968).

To compute the Jensen's alpha, the following formula is used:

$$a_i = r_i - \left[r_f + \beta_i \times \left(E(r_m - r_f)\right)\right] = r_i - E(r_i)$$

Where:
$ai =$ Jensen's Alpha of the asset
$ri =$ Return of the asset
$rf =$ Risk-free rate
$\beta i =$ Market exposure of the asset
$E(rm) =$ The expected return of the market
$E(ri) =$ The expected return of the asset

3.6. Selection of benchmark

In previous studies from Mallin et al. (1995) and Kreander et al. (2005) different types of benchmarks indices have been used to compare and evaluate the performance of funds. The use of a benchmark index is a suitable way to give knowledge on how a fund's performance is compared to the rest of the market (Fondbolagens förening, 2019a). The paper by Mallin et al. (1995), on sustainable funds on the UK market, used the Financial Times All Share Actuaries (FTSE) index as a benchmark to the study, an index which represents about 98-99% of the UK market capitalization (FTSE Russel, 2021). The study by Kreander et al. (2005), which focus on the European market used two different indices as benchmarks. When evaluating funds to the global markets, Kreander et al. (2005) used the Financial Times World Index (FTWI) as a benchmark. For funds investing only in domestic securities, the study by Kreander et al. (2005) used the main domestic index for each of the examined funds, for example for the UK funds the FTSE were used.

This thesis only examines funds which have a minimum of 80% invested in Swedish companies, it is therefore suitable to use a benchmark which reflects the market return of the Stockholm Stock Exchange. Therefore, the chosen index used in this study is the OMX Stockholm All-Share Index (OMXSPI). The index has the aim to reflect the overall value of all the listed stocks on the Stockholm Stock exchange (Nasdaq, 2021). All historical data used in this thesis is collected from the Nasdaq OMX Nordics website (*ibid*).

3.7. Risk-free interest rate

When investors buy an asset, it is expected that the asset will generate a financial return over the time horizon that the investor owns it (Damodaran, 2008). The financial return generated from different assets can vary depending on the risk of the assets. Risk connected to financial investments is viewed in terms of the variance in actual returns and the expected return (*ibid*). For an investment to be risk-free, the actual return of an investment should always be equal to the expected return. The risk-free interest rate is the theoretical rate of return for an investment with no risk.

When deciding what type of risk-free interest rate to use for this thesis, it is important to use a suitable risk-free interest rate which reflects the market this thesis examines. This thesis is examining Swedish funds with a minimum of 80% of its assets in Swedish companies, hence, it is therefore appropriate to use a risk-free rate reflecting the Swedish market. Swedish treasury bills are an asset issued by the Swedish state to finance the central government's short-term borrowing requirements (Sveriges Riksbank, 2020). Treasury bills can be issued with a maturity of monthly, three months, six months, and twelve months. In the studies by Mallin et al. (1995) and Kreander et al. (2005) they use Swedish treasury bills with three months of maturity. In this thesis, treasury bills with a three-month maturity to reflect the risk-free interest rate is used.

3.8. Data analysis

When all data has been collected from its sources it is summarized in Microsoft Excel. Microsoft Excel is chosen because of the ease to format big datasets and perform different calculations. All calculations, such as average daily return, and standard deviation are performed in Microsoft Excel, as well as all evaluation ratios, such as the Sharpe Ratio, the Jensen's alpha and the Treynor ratio. The daily return for each of the sustainable and conventional funds has all been summarized within their category to calculate the average performance. All results from the calculations are summarized in Excel and analyzed before presented as a result in the thesis.

3.9. Statistical significance

This thesis uses a t-test to analyze the performance ratios and to see if the results from them are statistically significant. The studies by Mallin et al. (1995) and Kreander et al. (2005) also use t-test to examine if the results from performance ratios are statistically significant when analyzing the risk-adjusted return. By using a t-test, it is possible to spot differences in the study's result, and to find if the result can be generalized as significant for the whole population. The t-tests will generate a p-value, which describes if the result is statistically significant or caused by randomized factors. The t-tests will be performed on results from the Sharpe ratio, the Treynor ratio and the Jensen's alpha. The t-test is done with calculations in Microsoft excel. The significance level is set to 5 percent, the same as what Mallin et al. (1995) and Kreander et al. (2005) used.

3.10. Reliability and validity

When performing a quantitative study, it is important that the study is done with *reliability* in mind (Bryman & Bell, 2015). Reliability within the field of quantitative studies is about consistency, conformity, and reliability, and from an author perspective it is therefore important to have three factors in mind when questioning whether the study is reliable. The three factors are *stability* i.e., if the measurement is stable enough to be convincing over time, *internal reliability* i.e., if the indicators which constitutes a scale are reliable and trustworthy, and *internal assessor reliability* i.e., if the chosen data can be analyzed with an objective assessment. If a study is reliable, it means that it should be possible to replicate by another author and reach the same results.

This thesis shows reliability by using well known secondary sources with high creditability and already proven measurement models used in earlier studies. By using well known ratios such as the Sharpe ratio, The Treynor ration and Jensen's alpha, the study is possible to replicate for further research. By using well known ratios the author of this thesis guarantees that the approach is stable and reliable, which improves the reliability. The chosen equity funds in this study have been selected from a well-known webpage that contains sustainability ratings, size of the funds and how the funds have invested their capital. All this makes the study reliable, but it does not automatically make the study valid (Bryman & Bell, 2015).

Validity in a study determines to what extent the study really measure what it is supposed to in accordance with aim and research questions of the study (Bryman & Bell, 2015). Validity is assessed by checking how well the result is corresponding with established theories and other measures of the same concept. When a study is

valid it is generally reliable, if a measure produces an accurate result, it should be reproducible (*ibid*). This study aims to examine how the risk-adjusted return differed between sustainable and conventional equity funds on the Swedish fund market during the year 2020 with Covid-19 effects. To achieve validity for this thesis, the author has made a literature review about financial performance, risk-adjusted return, and the impact of Covid-19 on both sustainable and conventional funds. The formulas and measurement used to perform the study are well used in previous literature and in similar studies.

3.11. Reflections on the study

This study uses a quantitative methodology, to examine the risk-adjusted return for sustainable and conventional funds. To examine this, different evaluation models are used in combination with data collected from secondary sources. The evaluation models are well known and used in similar studies. A weakness of the study is that the Covid-19 pandemic is an ongoing pandemic when this thesis is written.

The period of examination is justified by the movements of the OMXSPI-index, where the interesting movements occurred during 2020. The period used for examination can also be criticized for being too short, and therefor makes it hard to draw conclusions for sustainable and conventional funds in general. A longer period of examination would create more data to analyze and give possibility to see greater difference. Previous studies from Ferriani & Natoli (2020), Folger-Laronde et al. (2020), and Pástor & Vorsatz (2020) performed studies during the same period, during 2020, which gives this study credibility.

A critique towards the use of quantitative methodology, is that there is possible to draw a conclusion, but harder to give a proper explanation to the result. The result of this study can conclude that either the sustainable or conventional funds generated higher risk-adjusted return, or that there was no difference in risk-adjusted return between the peers. This will generate in a conclusion, and some explanations to why the result is as it is, but it is hard to generate a deep background explanation to why the result is as it is.

4. Analysis and result

In this chapter the result from the empirical data is presented, after it has been calculated and evaluated through the different evaluation models in Excel. The presentation of the results has the aim to be as descriptive as possible. The presentation is divided into two parts, one for the full sample period and one for the sub-periods. The results are presented to give answer to the research questions.

The research questions of the study are:

- Was there any difference in risk-adjusted return between sustainable and conventional equity funds during the Covid-19 financial market crash?
- Were sustainable funds able to perform higher risk-adjusted return during the period of recovery?

The results presented in the following parts aim to give clarification if there was any difference in risk-adjusted return between sustainable and conventional equity funds.

4.1. Performance during the full sample period

The full sample period of analysis for this study is between 2020-01-01 to 2020-12-31, to give an understanding of how the two fund categories performed during the full year. During the full year, the sustainable funds performed an average daily return of 0.08% and the conventional funds performed an average daily return of 0.06%. In comparison to this, the benchmark-index OMXSPI had an average daily return of 0.06% during the full year. The result shows that the sustainable funds performed higher daily average return than both the conventional funds and OMXSPI during the full year.

Table 1. Average return and performance measure for the period 2020-01-01 – 2020-12-31

	Sustainable funds	Conventional funds
Daily average return	0,08%	0.06%
Standard deviation	1.75%	1.71%
Sharpe ratio	0.05	0.03
Beta	0.900	0.9300
Treynor ratio	0.0010	0.0006
Jensen's alpha	0.000320	0,000040

As can be seen in Table 1, the sustainable funds were able to generate a higher daily average return than the conventional funds. The sustainable funds performed better in terms of risk-adjusted return compared to the conventional funds in all evaluation models. The sustainable funds had higher standard deviation than the conventional funds, which shows that they had higher volatility. The higher results in Table 1 are marked with green, to identify which of the fund categories that performed best.

4.1.1. Standard deviaiton

Standard deviation is a statistical measurement used to measure the variance in, for example, a fund's return. The measurement reflects the volatility and fluctuations in returns. A higher standard deviation means that the fund has a higher volatility, and a lower standard deviation means that the fund has lower volatility. During the full sample period, the sustainable funds had a result of 1.75% in standard deviation and the conventional funds had a result of 1.71% in standard deviation. The benchmark index OMXSPI had a standard deviation of 1.76% during the same period. The empirical findings are that the sustainable funds had a higher volatility than conventional funds but had a lower volatility than OMXSPI.

4.1.2. The Sharpe ratio

The Sharpe ratio measures the return of a fund in relation to the additional unit of each risk the fund takes. The Sharpe ratio uses the risk-free rate and standard deviation to calculate how high the level of return that can be expected by adding extra units of risk. The higher the Sharpe ratio is, the higher the risk-adjusted return of the fund is. The empirical findings shown in Table 1 shows that sustainable funds had a daily average Sharpe ratio of 0.0470 during the full sample period, and

conventional funds had a daily average Sharpe ratio of 0.0334. The benchmark-index OMXSPI had a Sharpe ratio of 0.0321 during this period. The result shows that sustainable funds had a higher average return, given the total risk of the compared return of the conventional funds. An explanation for this result can be that the sustainable funds had a higher average return during the period.

4.1.3. Beta

Beta is a measure that indicates how much a fund has fluctuated historically, in relation to the benchmark index. If the beta is equal to 1, it means that the fund has strong correlation to the benchmark index, if the beta is lesser than one it indicates that theoretically the fund is lower volatile than the benchmark. When beta is greater than one it indicates that the fund is more volatile than the benchmark index. The sustainable funds in this study, over the full year, have a beta of 0.900 and the conventional funds has a beta of 0.9300. This indicates that the sustainable funds had a lower volatility in relation to the OMXSPI-index.

4.1.4. The Treynor ratio

The Treynor ratio determines how much excess return generated for each unit of extra risk taken. The Treynor ratio refers the risk as systematic risk, which is measured by a portfolio's beta. A higher Treynor Ratio is better and shows that the risk-adjusted return is higher. When measuring the two fund categories, the result is that sustainable funds had a ratio of 0.0010 and conventional funds 0.0006. The result shows that sustainable funds were able to perform a higher risk-adjusted return during the full period. The reason for this might be that the sustainable funds had a lower average beta value, and gave a higher average return, during the full sample period.

4.1.5. The Jensen's alpha

The Jensen's alpha is a risk-adjusted performance measurement that evaluates if a fund outperforms its benchmark index. By using CAPM, it is possible to evaluate how a fund handles systematic risk. If the Jensen's alpha is positive, the fund was able to generate a higher return than expected and beat its benchmark index. If the result is negative, the fund was not able to reach its expected return and did not beat its benchmark index. This study uses the daily average return of the funds to compute the Jensen's alpha. The funds within the sustainable category performed a daily average value of 0.000320 and the conventional funds performed an daily average value of 0,000040. The result shows that both fund categories were able to generate a higher return than expected and that the sustainable funds performed better than conventional funds.

4.2. Performance during sub-periods

The study uses sub-periods to evaluate how the two fund categories performed before the crash, during the crash, and their performance afterwards referred to as the recovery period. The sub-periods present results on how the funds were affected by the Covid-19 financial crisis. The empirical results are presented below in Table 2 and are compared to the market performance during each period. The period between 2020-01-01 - 2020-02-19 presents the performance before the crash, the period 2020-02-20 - 2020-03-23 reflects the equity funds' performance during the decline in markets, the last sub-period between 2020-03-24 - 2020-10-05 reflects the funds' performance during the recovery.

Table 2. Average return and performance measure for sub-periods

	Sustainable funds	Conventional funds
Daily average return		
20-01-01 – 20-02-19	0.15%	0.14%
20-02-20 – 20-03-23	-1.84%	-1.81%
20-03-24 – 20-10-05	0.37%	0.34%
Standard deviation	Sustainable funds	Conventional funds
20-01-01 – 20-02-19	0.93%	0.89%
20-02-20 – 20-03-23	3.34%	3.12%
20-03-24 – 20-10-05	1.57%	1.59%
Sharpe ratio	Sustainable funds	Conventional funds
20-01-01 – 20-02-19	0.1650	0.1623
20-02-20 – 20-03-23	-0.5514	-0.5803
20-03-24 – 20-10-05	0.2376	0.2137
Beta	Sustainable funds	Conventional funds
20-01-01 – 20-02-19	0.7968	0.8569
20-02-20 – 20-03-23	0.8658	0.9526
20-03-24 – 20-10-05	0.9333	0.9413
Treynor ratio	Sustainable funds	Conventional funds
20-01-01 – 20-02-19	0.0020	0.0017
20-02-20 – 20-03-23	-0.0221	-0.0191
20-03-24 – 20-10-05	0.0040	0.0036
Jensen's alpha	Sustainable funds	Conventional funds
20-01-01 – 20-02-19	0.000187	-0.000035
20-02-20 – 20-03-23	-0.033835	-0.035056
20-03-24 – 20-10-05	0.000603	0.000253

The daily average return presented in Table 2, shows that the sustainable funds were able to perform a higher daily average return than the conventional funds' during the first and last period. In the first period, the sustainable funds performed a daily average return of 0.15% and the conventional funds with an average return of 0.14%. During the second sub-period, reflecting the funds' performance during the Covid-19 market crash, the sustainable funds generated lower daily average return, (-1.84%) than the conventional funds, (-1.81%). During the last period, the sustainable funds performed an average daily return of 0.37% and the conventional funds performed an average daily return of 0.34.

4.2.1. Standard deviaton

In the first sub-period, the sustainable funds had an average standard deviation of 0.93% and the conventional funds had an average standard deviation of 0.89%. This shows that the sustainable equity funds had higher variance in their daily average return during the first sub-period. In the second sub-period, reflecting the market crash, the sustainable funds had an average standard deviation of 3.34% and conventional funds had a lower average standard deviation of 3.12%. In the last sub-period, reflecting the recovery, the conventional funds showed an average standard deviation of 1.57% and the conventional funds had an average standard deviation of 1.59%, having a slightly higher variance and risk in the average daily return in comparison to its peers.

4.2.2. The Sharpe ratio

In the first period, the sustainable funds generated a higher Sharpe ratio of 0.1650, whilst the conventional funds had a slightly lower Sharpe ratio of 0.1623. This result implies that the sustainable funds were able to generate a higher risk-adjusted return. In the second period the sustainable funds performed a higher average Sharpe ratio (-0.5514), in comparison to the conventional funds (-0.5803). The lower Sharpe ratio for conventional funds means that they generated a lower return given the total level of risk in the funds. During the last sub-period, the sustainable funds had the higher Sharpe ratio again, sustainable funds had a Sharpe ratio of 0.2376 and the conventional funds had a Sharpe ratio of 0.2137.

4.2.3. The Treynor ratio

The sustainable funds had a Treynor ratio of 0.0040 during the first period, and the conventional funds had a ratio of 0.0017. The result shows that the sustainable funds were able to perform better risk-adjusted return per unit of systematic risk taken than the conventional funds. In the second period, the conventional funds had a higher Treynor ratio, -0.0191, whilst the sustainable funds had a ratio of -0.0221. This shows that the sustainable funds had a lower risk-adjusted return per unit of

systematic risk. In the last sub-period, the sustainable funds performed a Treynor ratio of 0.0040 in comparison to the conventional funds which performed 0.0036.

4.2.4. The Jensen's alpha

In the first sub-period, the sustainable funds performed a higher Jensen's alpha of 0.000187, in comparison to the conventional funds -0.000035. The result shows that the sustainable funds performed higher excess return than expected when computing the CAPM and the conventional funds underperformed its expected return. During the second sub-period, both categories of funds did underperform its expected return, with the sustainable funds generating a Jensens' alpha of -0.033835 and the conventional funds -0.035056. In the last sub-period, the sustainable funds outperformed the conventional funds, the sustainable funds measured a Jensens' alpha of 0.000603 when calculating with the CAPM, whilst the conventional funds measured a Jensens' alpha of 0.000253. Important to notice is that both fund categories were able to generate higher return than expected.

4.3. T-test for full period

The use of a t-test is to show if there is any statistical significancy between the two groups of funds. The t-test was performed on the Sharpe ratio, the Treynor ratio and the Jensen's alpha. To answer the research question if there was any difference in risk-adjusted return between the two fund categories, the average value of the measurements was analyzed for the full sample period. The result from the measurement models shows that the sustainable equity funds performed higher risk-adjusted return than the conventional funds.

Table 3. T-test for the full period

Evaluation model	P-value
Sharpe ratio	0.8732
Treynor ratio	0.8342
Jensen's' alpha	0.8493

The results from the risk-adjusted measurements were, after the analysis, tested in a t-test to generate a p-value to see if there is any statistical significancy between the pairs. The result from the t-test generated high p-values for all ratios, which indicates that the difference between the two categories is non-significant. The T-test was done at the 5 percent significance level and gives the result that the null

hypothesis for hypothesis 1 cannot be rejected. In the analysis the sustainable funds achieved higher risk-adjusted return than the conventional funds, however these results could not be statistically significant to the conventional funds. The non-significant results, implies that the results from the evaluation models cannot be applied for the whole population, and the two fund categories are expected to have the same performance over time.

Table 4. Null hypothesis for hypothesis 1

H1: Sustainable funds performed higher risk-adjusted return than conventional funds during the full year of 2020.	P-value Significant (P<0.05)	Decision for H_0
Sharpe ratio	P = 0.8732 Not significant	Not rejected
Treynor ratio	P = 0.8342 Not significant	Not rejected
Jensen's' alpha	P = 0.8493 Not significant	Not rejected

4.4. T-test for sub-periods

The results from the risk-adjusted return for the sub-periods, shows that the sustainable funds performed higher results in all risk-adjusted measures in all sub-periods, except in the period 2020-02-20 – 2020-03-23 for the Treynor ratio. The results from the different performance measure were then tested in a t-test to generate p-values to see if the results are statistically significant.

Table 5. T-test for sub-periods

Sharpe Ratio	**P-value**
20-01-01 – 20-02-19	0.97159586
20-02-20 – 20-03-23	0.98842025
20-03-24 – 20-10-05	0.83679989
Treynor ratio	**P-value**
20-01-01 – 20-02-19	0.91957715
20-02-20 – 20-03-23	0.87328549
20-03-24 – 20-10-05	0.69326193
Jensen's alpha	**P-value**
20-01-01 – 20-02-19	0.94642205
20-02-20 – 20-03-23	0.97389832
20-03-24 – 20-10-05	0.78618389

All t-tests for the risk-adjusted measures generated high p-values, which shows that none of the results are statistically significant. The t-test were performed with a significancy level of 5 percent, which gives the result that the null hypothesis for hypothesis 2 cannot be rejected. The result of non-statistically significance implies that the findings is not applicable for the whole population, and that the fund categories are expected to have the same performance over time.

Table 6. Null hypotheses for hypothesis 2

H2: Sustainable funds performed higher risk-adjusted return during the third sub-period between 2020-03-24 – 2020-10-05.	P-value Significant (P<0.05)	Decision for H_0
Sharpe Ratio 2020-03-24 – 2020-10-05	P = 0.98842025 Not significant	Not rejected
Treynor Ratio 2020-03-24 – 2020-10-05.	P = 0.87328549 Not significant	Not rejected
Jensen's Alpha 2020-03-24 – 2020-10-05.	P = 0.97389832 Not significant	Not rejected

5. Discussion

The aim of this study was to examine how the risk-adjusted return differed between sustainable and conventional equity funds on the Swedish fund market during the year of 2020. This was to give an understanding of how sustainable and conventional funds were affected in risk-adjusted return because of the Covid-19 financial crisis and to see whether sustainable funds were able to perform higher risk-adjusted return during times of high uncertainty. The funds were examined during the full year of 2020 and examined in sub-periods to better analyze the performance of the funds and create greater knowledge on the fund's development.

To be able to fulfil the aim of the study, two hypotheses were established:

H1: Sustainable funds performed higher risk-adjusted return than conventional funds during the full year of 2020.

H2: Sustainable funds performed higher risk-adjusted return during the third sub-period between 2020-03-24 – 2020-10-05.

The results from the analysis for the full sample period, has the result that the sustainable funds performed higher risk-adjusted return than the conventional funds, this result however was not statistically significant. These findings are in line with what some of the previous studies have stated. The study from Mallin et al. (1995), showed that sustainable funds were able to outperform conventional funds in risk-adjusted return during a longer set of periods, with the conclusion that the outperformance by sustainable funds might only be a temporary phenomenon. Mallin et al's. (1995) study, comparing the two types of funds did also have non-statistically significant result. In this study, examining the funds during Covid-19, it is shown that sustainable funds can perform better than conventional funds on the Swedish market even during a shorter set of periods, and when there is high uncertainty in the market. The outperformance by sustainable funds over conventional funds, gives Hübel and Scholz' (2019) paper some support that during uncertain times and recessions, it might be a good idea to invest in funds with high sustainability ratings. Nofsinger & Varma (2012) have a similar conclusion as Hübel and Scholz (2019), i.e., that sustainable funds can perform higher risk-

adjusted return during recessions and high uncertainty. Nofsinger & Varma (2012) claim that the performance by sustainable funds in recessions, comes at the cost from underperforming during normal times. What can be seen in this study is that during the period before the market crash, the sustainable funds performed slightly higher risk-adjusted return than the conventional funds, important to notice is that the period of examination is only two months and to give an equitable view on this, the study needs to be performed over longer periods. Both Hübel and Scholz (2019), and Nofsinger & Varma (2012) studies examine other markets than the Swedish fund market. It is interesting, that there are similar results, i.e., that sustainable funds do perform higher risk-adjusted return than its peers. Important to note, that the results for this study on the difference in risk-adjusted return between sustainable and conventional funds is not statistically significant.

The sustainable funds examined in this thesis performed higher risk-adjusted return than conventional funds during the third sub-period. The third period represents the recovery period after the Covid-19 financial crisis. None of the periods during the sub-periods are statistically significant, and the null hypothesis for hypothesis 2 cannot be rejected. Because of the non-statistical result for the sub-periods, it is not possible to draw any conclusions for the whole population.

The last sub-period between March 24th to October 5th is comparable to what Ferriani and Natoli (2020) set as a recovery period. Ferriani and Natoli (2020) concluded that funds with lower risk related to ESG-factors had a greater inflow of capital during the effects of Covid-19 financial crisis. They could also conclude with their study that especially after the crash, there was a greater inflow of capital in sustainable funds. Ferriani and Natoli's (2020) result in combination with this study's result, even if this study does not show statistical significance, indicates that investments into funds with high a sustainability rating during and after declines in the financial markets might be a good idea. The study from Folger-Laronde et al. (2020), which examined the performance of Canadian ETF:s during the Covid-19 financial crisis, showed results that investments with higher sustainability ratings did not perform better than investments with lower sustainability ratings. Folger-Laronde et al. (2020) used Corporate Knight Eco-fund rating system to categorize and sort out the funds. The Corporate Knight rating system functions that if a fund holds an equity with what they call a "red flag", the system penalizes the whole fund and sets a sustainability rating to 0%. This gives an unclearness if the funds consist of several "red flags", or if it is just one asset that makes the fund unsustainable. According to Folger-Laronde et al. (2020), this is a limitation for their paper and might be a reason why their study reached different findings than this study. The author of this study uses MSR to select funds, which is more equitable in its way to rate funds' sustainability, which might be a reason for why

there is a different result. The MSR does not directly rate a fund as unsustainable if one asset in the fund has low sustainability rating. Two other reasons why their study differs in result in comparison to this study is the selected market for examination, Folger-Laronde et al. (2020) focuses on ETF:s on the Canadian market, and this study focuses on the Swedish fund market, which is seen as a frontrunner for sustainable investments. The other reason for differences in result might be the investment type that is examined, ETF:s are similar equity funds, but they are not identical in terms of the financial construction. ETF:s market price is determined by a market maker to reflect the value of the fund and can be directly traded when the market is open. An equity funds price is determined by collecting all the funds' holdings and divide it by number of shares of the fund. The value and price of an equity fund is only set once a day or once a month.

Pástor & Vorsatz (2020) performed a study examining actively managed funds on the US market, with the conclusion that most of the actively managed funds were outperformed by their benchmark index during the Covid-19 financial crisis. In contrast to the Folger-Laronde et al's. (2020) study, the study by Pástor & Vorsatz (2020) use MSR rating to sort out funds with high sustainability rating. Like this study, Pástor & Vorsatz (2020) considered sustainable funds to have a rating of 4-5 globes, and instead of 1-3 globes for conventional funds, they set the limit to 1-2 globes for funds to be considered conventional. To create even deeper understanding on the funds return, they examined funds within each of the globes and saw that funds with the highest rating (5 globes), outperformed the ones with 4 globes, and as well the ones with 4 globes outperformed the funds with 3 globes, and so on. Pástor & Vorsatz (2020) examined only the performance of different funds and did not take risk-adjusted return in consideration when comparing different funds. For this study, the main examination is to develop an understanding of how the risk-adjusted return differed between the fund types. But when looking at the excess return of the funds, there is some similarities to what Pástor & Vorsatz (2020) concluded. The sustainable funds performed lower daily average return during the second period, but in the recovery period the sustainable funds performed higher daily average return than the conventional funds.

Jin (2018) examines how ESG-investments handle systematic risk, so does this study. By using the measurement models the Sharpe ratio, the Treynor ratio and the Jensen's alpha it is possible to establish an understanding of how the two fund categories handles systematic risk. What can be seen from the results from the different ratios, is that the sustainable funds performed better in almost all the ratios than the conventional funds. During the second sub-period (20/02-20 - 23/03-20), the conventional funds performed a higher Treynor ratio than the sustainable funds. This shows that the conventional funds were rewarded with less losses than

sustainable funds by taking extra unit of risk, notable in this study, that none of the funds were able to perform higher daily average return than the benchmark index during the second period.

The result from this thesis derives from evaluating and analyzing equity funds, by dividing them into two groups, either sustainable or conventional. For funds to be considered sustainable, they needed to have a rating of 4-5 globes on the MSR, and for those who rated 1-3 globes in MSR, were considered conventional funds. The funds were also selected to be matched pair, so each of the funds had a similar fund in the other category, but with a different MSR. For a fund to be selected for either the sustainable or conventional category, it had to have at least 80% of its asset in Swedish companies. With these conditions, there is a possibility that some of the conventional funds holds a sizeable number of sustainable companies, and therefore have similar holdings as the sustainable funds. This could indicate that the two categorize of funds do not differ that much in investment strategy as the ranking suggests.

From the results it can be stated that sustainable funds outperformed the conventional funds in daily average return during all periods except the most critical period, between 20th of February to 23rd of March. However, the results from the evaluation models used in the study do not show a high enough statistical significancy. A reason for the low statistical significancy might be explained by the selection of funds, there might be too few funds in the examination, and the strategy for investment might be too similar between the two categories to show any greater difference in result to be statistically significant.

6. Conclusions

Investments into funds in Sweden has increased since the start of Fondbolagens förening 1979, and the interest for sustainable funds have increased in recent years. Those who invest in sustainable funds do it for two reasons: To gain financial return, and to improve the possibility for a sustainable future. Previous studies performed on the topic of difference in financial return and risk-adjusted return between sustainable and conventional funds differs and present inconclusive results. Previous studies about the difference in performance during the Covid-19 financial crisis have been focusing on either the US, Canadian or the global markets in general. The aim of this study was to examine how the risk-adjusted return differed between sustainable and conventional equity funds on the Swedish fund market during the year of 2020. This was to give an understanding how sustainable and conventional funds were affected in risk-adjusted return because of the Covid-19 financial crisis. To fulfil the aim of the study, the following research questions were established:

- Was there any difference in risk-adjusted return between sustainable and conventional equity funds during the Covid-19 financial market crash?
- Were sustainable funds able to perform higher risk-adjusted return during the period of recovery?

To answer the two research questions, 10 sustainable and 10 conventional equity funds were chosen from the Swedish fund market to be evaluated and analyzed. For a fund to be considered sustainable it needed a rating of 4-5 globes on MSR, and for a fund to be considered conventional it had a rating of 1-3 globes on MSR. The funds were matched to have similar net asset values and investments in similar industries. The funds were evaluated during the full year of 2020, and for three sub-periods during the year.

The results from the evaluation models, i.e., the Sharpe ratio, the Treynor ratio and the Jensen's alpha, showed no statistically significant difference between sustainable and conventional equity funds, neither for the full sample period and the sub-periods. It can therefore not be stated that sustainable equity funds were able to perform higher risk-adjusted return than the conventional funds. However,

when analyzing the risk-adjusted return, the results indicates that the sustainable funds were able to perform higher risk-adjusted return than the conventional funds during the full sample period. During the second sub-period, during the crash between February 20th to March 23rd, the conventional funds performed higher risk-adjusted return with the evaluation model Treynor ratio, otherwise the sustainable funds performed higher risk-adjusted return during all sub-periods, and in all different evaluation models, if the non-statistically significant result would be ignored.

The results from this study, leads to the conclusion that private investors could have chosen to invest in either sustainable or conventional equity funds during the Covid-19 financial crisis and have expected equal risk-adjusted return. This is because there is no statistically significant difference between the two categories.

6.1. Future research

There are several previous studies examining the difference in performance between sustainable and conventional funds, both during longer periods and during the Covid-19 financial crisis and during other recessions. With this study, the Swedish fund market, and Swedish funds with a minimum of 80% invested in Swedish companies were examined. With the results from this study in combination with the literature review, great possibilities for future research are created.

The Swedish and Scandinavian fund markets are often seen as frontrunners for sustainable investments, for future research it would be interesting to examine how funds differ in performance between the countries. Furthermore, it would be interesting to examine how Swedish funds with high sustainability rating performs in comparison to global funds in different recessions or crisis. A study on this topic, would clarify if funds with a high level of investments into Swedish companies, would be able to perform higher risk-adjusted return than those funds who invest globally.

Future research could also be focusing directly on the stocks, a comprehensive study focusing on how stocks with high sustainability rating performs during either the Covid-19 financial crash or during recessions in general in comparison to those stocks with low sustainability rating. By evaluating the performance of the stocks, it can give knowledge if there are certain sectors which are able to perform better than others during recessions. This could give an idea for investors on which type of industries and focus there should be on their investments during recessions and when a crisis hit.

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Appendix 1

Sustainable funds	Conventional funds
AMF Aktiefond Sverige	Didner & Gerge Aktiefond
C Worldwide Sweden Small Cap	Ethos Aktiefond
Carnegie Sverigefond	Handelsbanken Sverige Index Criteria
Enter Småbolagsfond A	Nordea Småbolagsfond
Handelsbanken Svenska Småbolag	Norron Sicav Active RC SEK
Lannebo Småbolag	PriorNilsson Sverige Aktiv
Länsförsäkringar Sverige Aktiv	SEB Hållbar Sverige Indexnära
SEB Hållbarhetsfond Sverige Index	SEB Sverige Expandera
Spiltan Aktiefond Investmentbolag	SEB Sverigefond
Spiltan Aktiefond Stabil	Swedbank Robur Access Sverige

Appendix 1. Funds used in this study.